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WATER QUALITY MEMORANDUM
Utah Coal Regulatory Program

February 10, 2011

TO: Internal File

FROM: April A. Abate, Environmental Scientist III 2-10-11

THRU: James D. Smith, Permit Supervisor JS 02/14/11

SUBJECT: 2010 2nd Quarter Water Monitoring: Bear Canyon Mine, C/015/0025, Task ID # 3554

The monitoring plan is described on pages 7-48 through 7-60A of the MRP. It includes Tables 7-12 through 7-17. The mine is now operating under a permit held by Castle Valley Mining, LLC.

1. Were data submitted for all of the MRP required sites?

In-mine YES ☒ NO ☐

A total of four in-mine samples are listed in the Bear Canyon water monitoring plan: SBC-9A, 16-8-8-10, UG-1 and UG-2. UG-1 and UG-2 do not have any specified monitoring protocol.

The Mohrland Portal, sample 16-8-8-10 was sampled for field parameters and SBC-9A was sampled during the 2nd quarter for operational parameters.

Springs YES ☒ NO ☐

Most of the spring samples in and around the Bear Canyon mine are sampled for field, or either operational or baseline parameters. During the 2nd quarter, all the required springs were monitored during the months of May and June. SCC-5: Gentry Mountain Drainage Spg, SCC-1: Flagstaff Spg, No. Horn Spg, Price R, SBC-21, SMH-5: Stockwater Trough, and SBC 23: Bear Creek Landslide Spring all reported no flow.

Streams YES ☒ NO ☐

Stream sampling required for the 2nd quarter of each year is performed for both operational and field parameters. No flow was reported for the following stream samples: Upper and Lower McCadden Hollow Creek, Upper Right Fork Bear Creek, Channel at Mud Spring,

Upper Left Fork Fish Creek, Right Upper Left Fork Fish Creek.

UPDES YES ☒ NO ☐

Five stations are monitored for the Bear Canyon UPDES permit on a monthly basis. None of these stations reported any monthly flow data from the five stations during the 2nd quarter of 2010 with the exception was discharge point UTG040006-004 - Mine Water to Bear Canyon Creek, which was reported as flowing during the 2nd quarter of 2010.

Wells YES ☒ NO ☐

Four wells are monitored for depth to water measurements only from May through October. Only two of the four wells were monitored during the 2nd quarter of 2010 as required in the current water monitoring plan (Table 7-14).

2. Were all required parameters reported for each site?

In-mine YES ☒ NO ☐

Springs YES ☒ NO ☐

Streams YES ☒ NO ☐

UPDES YES ☒ NO ☐

3. Were any irregularities found in the data?

In-mine YES ☒ NO ☐

Bicarbonate in sample SBC-9A was outside of four standard deviations and elevated from previous sampling events. It should also be noted that pH was reported as highly alkaline during the first quarter at a reading of 9.5. The pH reported the second quarter decreased to 6.91.

Springs YES ☒ NO ☐

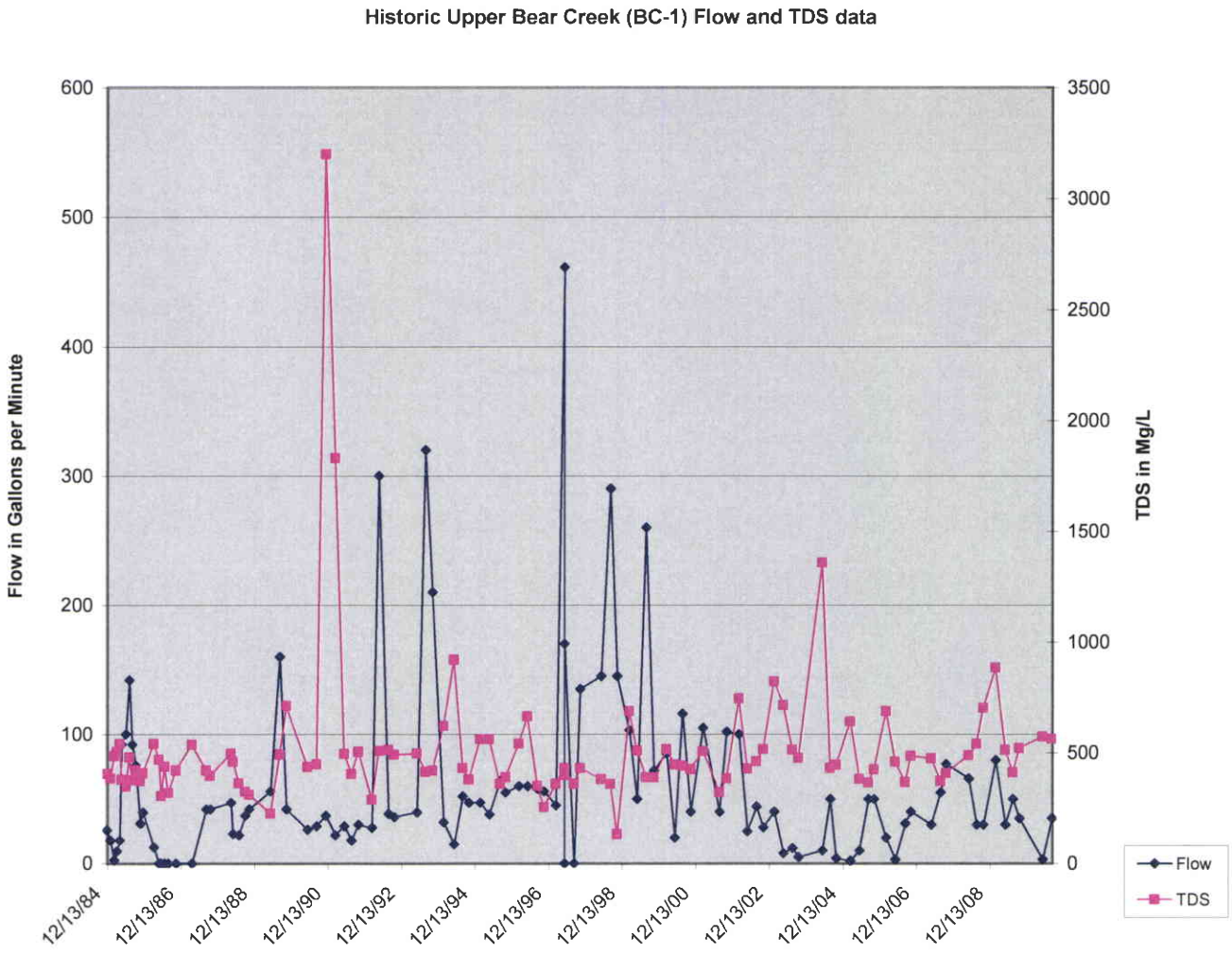
Flow was higher than normal at spring locations 16A and 16B. These springs represent the area near Wild Horse Ridge. The reported flow from these springs during the May sampling event was 27 and 25 gallons per minute (gpm), respectively. Bicarbonate was elevated in spring sample SBC017 by the waterfall.

Streams YES ☐ NO ☒

The following chart displays the analytes from the select stream samples that were flagged as being outside of two standard deviations from the average:

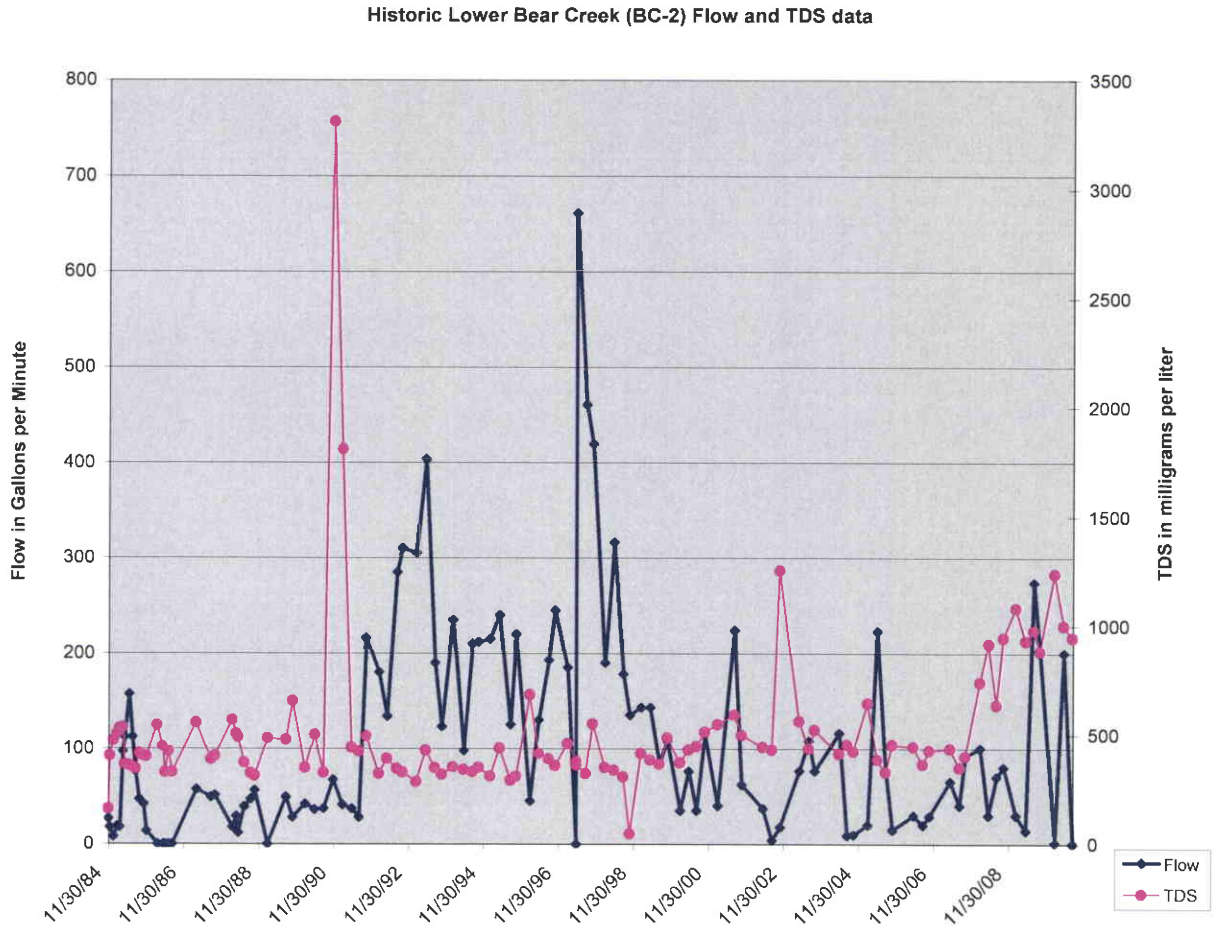
	SITE	Date	F-D.O.	Flow	D-Ca	D-K	D-Na	Bcrb CaCO3	Cl	NO3	T-Alk	T-Hardns	Set Solids	T-Cats	T-Anis	Cat-Ani
CK-1	Lower Cedar Creek	5/25/2010	9.5	125	67.3	1.5	6.3	352	5	< .1	289	400	< .2	8.4	8.3	-0.5
CK-2	Upper Cedar Creek	5/25/2010	9.1	700	85.6	3.5	7.6	334	5	< .1	274	471	< .2	9.8	10.2	-2.2
FC-1	Lower Left Fork of Fish Creek	5/25/2010	9.4	729												
BC-2	Lower Bear Ck	5/25/2010	11.42	200	89.6	13.2	81.4	622	7	3.1	510	989	1	23.6	21.1	5.7
BC-1	Upper Bear Ck	5/25/2010	11.57	35	60.5	5.3	10.2	1060	5	0.4	871	1110	2	22.7	22.3	0.9
FC-2	Lower Right Fork of Fish Creek	5/25/2010	10	128												
BC-3	Lower Right Fork Bear Creek	5/25/2010	11.27	6.4	131	13	54.5	461	38	0.4	387	1340	< .2	29.8	28.8	1.7

There is no clear correlation between excessive sediment loading and the analytes that are outside of two standard deviations. Total dissolved solids detections in all stream samples during this quarter were well below the state water quality standards of 4,800 mg/L. The one significant factor during this quarter was that the mine was in a cessation status while it was transitioning to new management. No mining operations were occurring during this time and therefore the water quality data could be more representative of baseline conditions. As such, an analysis of flow and Total Dissolved Solids (TDS) concentrations were made to samples from Upper Bear and Lower Bear Creek. Historic analysis starts from the initial data available in the Division water quality database up through the present collected on flow and TDS concentrations.



Analysis:

Over the past 26 years of data collection, flow in Upper Bear Creek typically averages about 42 gpm under static conditions. Spring and late summer flow rates tend to spike; however there have been no significant changes in flow rates since the mine has begun operation. TDS concentrations have typically averaged 442 mg/l in Upper Bear Creek. The state water quality standards for TDS at this reach of Bear Creek is set at 4800 mg/l. As can be seen on the above chart, TDS concentrations are well below the standard. Typically, higher flow rates are associated with lower TDS concentrations because sediment loading tends to occur when a stream flows at a lower velocity.



The graph of Lower Bear Creek does show a change in flow dynamics starting in the early 1990s. From 1984 to 1991, flow rates averaged 42 gpm, similar to the upstream conditions present in Upper Bear Creek (sample BC-1). After 1991, flow rates increased to an average of 100 gpm. TDS has remained fairly consistent with concentrations averaging at 414 mg/l from 1984 through 2007. Beginning in 2007, TDS concentrations have increased to an average of 924 mg/l. Although TDS concentrations remain well below the state water quality standards for TDS of 4800 mg/l, this uptick in concentrations is demonstrated on the above graph.

UPDES YES ☒ NO ☐

Mine water from Bear Canyon Creek at outfall 004 was the only point that discharged this quarter. Mine water has been consistently discharging from this location since May 2009. pH, Conductivity and TDS were all flagged as being outside of two standard deviations. The explanation given for the pH and conductivity values was

somewhat confusing in that the reason was cited as "verified with the lab report". These measurements are collected in the field and not typically analyzed in a laboratory. If measurements are analyzed in a lab, then they need to be reported in the database.

Wells YES ☐ NO ☒

4. On what date does the MRP require a five-year resampling of baseline water data.

Baseline parameters are to be taken in August of year 5 prior to each permit renewal (Table 7.14). The next permit renewal date was November 02, 2010; therefore, the baseline analyses should have been collected in August 2010.

5. Based on your review, what further actions, if any, do you recommend?

- Sample BC-3 at the Lower Right Fork of Bear Creek and BC-2, the most downstream stream sample location evaluated have both shown a recent increase in the levels of Total Dissolved Solids (TDS) since May 2008. This indicates that excess sediment may be discharging into the creek. The operator should evaluate sediment controls in this area and determine if there is any mitigation needed to control the level of sediment entering the water body. The location of stream sample BC-3 is an important one due to the fact that it is located adjacent to the main road. A high likelihood of this area receiving sediment from the disturbed area exists.

- Wells SDH-2 and SDH-3 will need to be located and gauged once the mining has progressed under these areas.

- Mine water discharge from UPDES Outfall 004 should be monitored by the laboratory for field parameters such as pH and conductivity as a means to check the quality of the data being collected in the field.

6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements? YES ☐ NO ☒

7. Follow-up from last quarter, if necessary.

- SBC-3, which is listed as the Right Fork Creek Well has shown considerably high levels of chloride, sulfate, TDS and hardness in the 1st quarter 2010 samples collected from it. These concentrations have gone down slightly in the 2nd quarter.

- Sample SBC-9A: pH readings have been on the alkaline side during the previous two quarters of monitoring. Mine water discharge this quarter was 6.91 – back in the neutral range but should continue to be monitored.

8. Did the Mine Operator submit all the missing and/or irregular data?

YES ☒ NO ☐

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